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The effects of hydrogen sulfide on the processes of exo- and endocytosis of synaptic vesicles in the mouse motor nerve endings

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Abstract

The effects of sodium hydrosulfide (NaHS), the donor of hydrogen sulfide (H2S), on the exo/endocytosis cycle of synaptic vesicles in the motor nerve ending of the mouse diaphragm were studied using intracellular microelectrode technique and fluorescent microscopy. NaHS increased the frequency of miniature end-plate potentials (MEPPs), without changing their amplitude-time parameters. NaHS also increased the amplitude of the evoked postsynaptic responses during single stimulation (0.3 Hz), which was the evidence of the enhanced synaptic vesicle exocytosis. During high-frequency stimulation (50 Hz), NaHS induced more significant decline of neurotransmitter release, probably due to the lower rate of synaptic vesicle mobilization from recycling pool to exocytic sites. NaHS also decreased the uptake of the fluorescent endocytic dye FM 1-43, which indicated the reduced endocytosis of synaptic vesicles. Thus, the H2S donor increases exocytosis and decreases the processes of synaptic vesicle endocytosis and mobilization in the mouse motor nerve ending.

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Keywords

exoand endocytosis, hydrogen sulfide, motor nerve ending, neurotransmitter release